COMPUTER ENGINEERING DEPARTMENT

SUBJECT: COMPUTER NETWORK

COURSE: T.E. **Year: 2020-2021** **Semester: V**

DEPT: Computer Engineering

SUBJECT CODE: CSC503 **EXAMINATION DATE: 12/01/2021**

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COMPUTER NETWORK ANSWER SHEET

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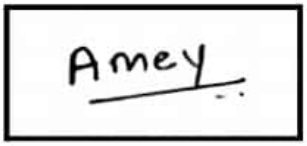
Exam : SEMESTER V

Subject : COMPUTER NETWORK

Date : 12/01/2021

Day : TUESDAY

Student Signature: 

Q.2. A.

IPv4 address

- IPv4 addressing system is divided into five classes of IP addresses.
- All the 5 classes are identified by first octate of IP addres

Class A address

- Class A address are for network with large number of total hosts.
- Class A allows for 126 network by using the first octate for network ID.
- The first bit in this octate is always set and fixed to zero. and next 7 bits in this octates are all set to 1. which then complete network ID.
- The 24 bit in the remaining octats - represents hosts ID. allowing 126 networks and approximately 17 million hosts per network
- Class A network number values begin at 1 and end at 127
- Example.

IP range = 1.0.0.0 to 126.0.0.0.

First octate value range from 1 to 127.

- Subnet mask = 255.0.0.0, 8 bits

Numbe of network = 126. No. of hosts per network = 16,777,214

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Class B

- Class B addresses are for medium to large sized networks.
- Class B allows for 16,384 networks by using the first two octets for network ID.
- 2-bits in first octate are set and fixed to 1.0 remaining 6 bits together with the next octet completes network ID
- 16 bits in 3rd and 4th octate represents host ID. allowing approx 65000 host per network
- Class B network number value begin at 128 and end at 191.
- Example: range = 128.0.0.0 to 191.255.0.0
  First octate value range from 128 to 191
  Subnet mask: 255.255.0.0 16 bits
  No. of network: 16,382
  No. of hosts per network: 65534

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Class C

- Class C addresses are used in small local area network. (LAN)
- Class C allows for approx 2 million networks by using first 3 octets for the network ID
- In class C address 3 bits are always set and fixed to 1.1.0.
- In the first 3 octates 21 bits complete total network ID.
- The 8 bits of last octate represent the host ID allowing for 254 hosts / network
- Class C network no. values begins at 192. and end at 223
- Example.

  range = 192. 0. 0. 0. to 223. 255. 255. 0

  First octate value range from 192 to 223

  Subnet mask : 255. 255. 255. 0 24 bits

  No. of networks = 2097150.

  No. of hosts / network = 254

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Class D

- Class D are not allocated to hosts and are used for multicasting.
- Example:
  range = 224.0.0.0. to 239.255.255.255
  First octate value range from 224. to 239.
  No. of networks ~~A~~ N/A
  N/A
- Number of host per network = multicasting

Class E.

- Class E are not allocated to hosts and are not available to general use
- Example
  range : 240.0.0.0. to 255.255.255.255
  First octate value range from 240 to 255
  No. of networks : N/A
  No. of hosts / network = research / reserve / experiment

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Q.2. B

- Advantages of fiber optics as communication medium

(1) Small size and light weight
- The size (diameter) of the optical fiber is very small. Therefore a large no. of optical fibers can fit into a cable of small diameter.

(2) Easy availability and low cost
- The material used for manufacturing of optical fibers is silica glass. This material is easily available so the optical fiber cost lower than the cables with metallic conductors.

(3) No electrical or electromagnetic interference.
- Since the transmission takes place in the form of light, noise the signal is not affected due to any electrical or electromagnetic interferences.

(4) Large bandwidth
- As the light rays have very high frequency in Giga hertz range the bandwidth of the optical fiber is very large.
- This allows transmission of more number of channels.
- Therefore the information carrying capacity of an optical fiber is much higher than coaxial cable

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(5) Security

— Optical fibers are difficult to tap as they do not radiate electromagnetic energy.
— Emissions cannot be intercepted as physically tapping the fibers takes great skill to do undetected.

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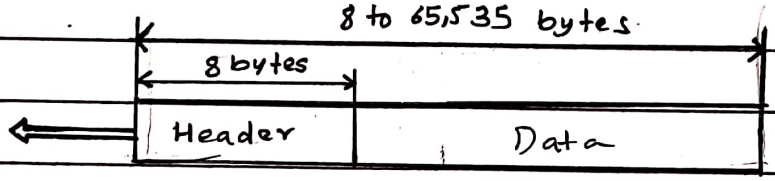
Q2. D

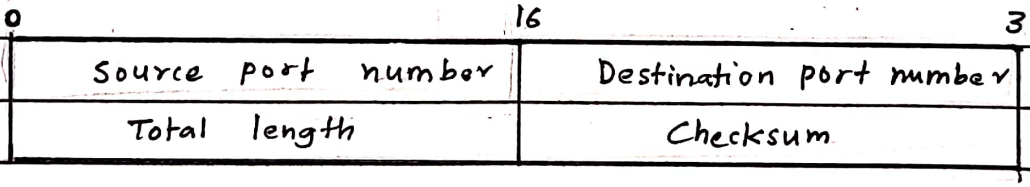
UDP Header Format.

- UDP packets are called user datagrams, have a fixed size header of 8 bytes.

User Datagram Format.



a. UDP user datagram



b. Header format

★ User datagram format

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(1) Source Port Number.
— This is the port number used by the process running on the source host.
— It is 16 bits longs which means that the port number can ranges from 0 to 65535.

(2) Destination Port number.
— This is the port number used by the process running on the destination host.
— It is 16 bits long.
— If the destination host is the server. The port number in most cases is a well known port number
— If the destination host is the client the port number in most cases is an ephemeral port number

(3) Length
— This is 16 bit field that define the total length of user datagram header + data
— 16 bits can define the total length of 0 to 65535 bytes.
— The length field in a UDP user diagram is actually not necessary

(4) Checksum
— This field is used to detect errors over the entire user datagram

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Q.2.E.

Open loop congestion control

- In this method, policies are used to prevent the congestion before it happens.
- Congestion control is handled either by the source or by the destination.
- The various methods used for open loop congestion control are:
  1. Retransmission Policy
  2. Window Policy
  3. Acknowledgement Policy
  4. Discarding policy
  5. Admission Policy

Retransmission Policy

- The sender retransmits a packet, if it feels that the packet it has sent is lost or corrupted
- However retransmission in general may increase the congestion in the network. But we need to implement good retransmission policy to prevent congestion.
- The retransmission policy and the retransmission timers need to be designed to optimize efficiency and at the same time prevent the congestion.

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Window Policy

- To implement window policy, selective reject window method is used for congestion control
- Selective reject method is preferred over Go-Back-n window as in Go-back-n method, when timer for a packet times out, several packets are resent, although some may have arrived safely at the receiver. Thus, this duplication may make congestion worse.
- Selective reject method sends only the specific lost or damaged packets.

Acknowledgement Policy

- The acknowledgement policy imposed by the receivers may also affect congestion.
- If the receiver does not acknowledge every packet it receives it may slow down the sender and help prevent congestion.
- Acknowledgements add to the traffic load on the network. Thus by sending fewer acknowledgements we can reduce load on the network.
- To implement it, several approaches can be used:
  1. A receiver may send an acknowledgement only if it has a packet to be sent.
  2. A receiver may send an acknowledgement when a timer expires.
  3. A receiver may also decide to acknowledge only N packets at a time.

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Discarding Policy

- A router may discard less sensitive packets when congestion is likely to happen.
- Such a discarding policy may prevent congestion and at the same time may not harm the integrity of the transmission.

Admission Policy

- It is a quality of service mechanism, can also prevent congestion in virtual circuit networks.
- Switches in a flow first check the resource requirement of a flow before admitting it to a network
- A router can deny establishing a virtual circuit connection if there is congestion in the network or if there is possibility of future congestion.

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Q.2. F.

Channel Allocation Problem

1. The MAC / media Access Control sublayer is between the physical layer and data link layer
2. The MAC sublayer is especially important in LANs. Nearly all of which. is use a multi access channels as the basis of their networks.
3. It mainly deals with LANs, Other broad cast networks and their protocols
4. The key issue = How to determine who gets the use of channel where there is competition for it.
5. (1) Static and Channel allocations in LAN & MAN
   (2) Dynamic Channel allocation in LANs & MANs

Static Channel Allocation

- In this scheme a fixed portion of the frequency channel is allocated to each other
- This scheme is also referred as fixed channel allocation
- In this scheme there is no interference between users since each use is assigned a fixed channel.

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Dynamic Channel Allocation

- In this scheme, frequency bands are not permanently assigned to users.
- Instead channels are plotted to users dynamically as needed from central pole.
- This allocation scheme optimizes bandwidth usage and result in faster transmission
- This channel is further divided into Centralized and Distributed allocations

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